



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

THE ADVANCE OF BIOLOGY IN 1897.

C. B. DAVENPORT.

THE delay in issuing the magnificent volume of *L'Année biologique* for 1897 is regrettable; but the labor involved in bringing the work of the year into a condition where the result will be quickly accessible is clearly tremendous and the standard of the editors seems to rise from year to year. As in the two previous years, I shall briefly sketch some of the results on which the editors lay most stress.

Cytology.—Important advances were made, especially by Kossel and his pupils in the chemistry of the more active proteids of the cell, and particularly of the spermatozoön. The theory that the centrosome is the center of the cell movements in general received support from its relation to the tail of the spermatozoön and probably (as a series of microsomes) to the cilia of epithelia. The variations in the constitution of the spindle, out of continuous and discontinuous fibres, was made clear. The mechanics of mitosis were further illustrated by the behavior of artificial mixtures and of machines; further evidence for the dependence of membrane formation upon the presence of the nucleus was brought forward.

The Sexual Products and Fecundation.—The variability of the process of chromatin reduction was made clear by the demonstration of the absence of a longitudinal division of the chromosomes, in one instance, and of the absence of any sort of reduction in a second (Lee); the transformations of chromatin during the growth of the ovum were further studied; the idea that polar globules are only aborted eggs received support from Francotte's observation that in polyclads they may be fertilized and develop into gastrulæ. Ivanzov interpreted maturation as an extrusion of ferments that might otherwise destroy the spermatozoön. The conclusion that the centrosome occupies the middle-piece of the spermatozoön gained a general

acceptance. The presence of antherozoid in gymnosperms was demonstrated.

In the field of *fertilization* studies, the opinion that the centrosome of the fertilized egg comes exclusively from the sperm was still dominant, despite the contradiction of *Myzostoma*; but the continuity of the centrosome was still debated.

Parthenogenesis. — A difference in structure between the parthenogenetic and the sexual egg of Rotifera was affirmed, and it was asserted that while in the female parthenogenetic egg of Rotifera only one polar globule is formed, two are permanently extruded when the parthenogenetic egg is destined to produce a male.

Asexual Reproduction. — It has long been recognized that the organs of an individual produced by budding or fission develop differently from those of an egg-individual. This difference can be referred to the dissimilarity of external conditions in the two cases. Thus von Bock showed that in dividing *Chaetogaster* the mouth of the new zoöid arises from two lateral invaginations instead of one ventral one, because the ventral position of the nerve cord interferes with a median invagination. Heschler showed that the regenerative capacity of the earthworm is greatest in the region where autotomy normally occurs. Bordage extended our knowledge of autotomy in Orthoptera.

Ontogenesis. — Echoes of the preformation-epigenesis controversy continued. Fischel, working with isolated blastomeres of ctenophores (*Beroë*), concludes that they afford a good example of preformation. Attempts to influence development by external means were richly rewarded. Hertwig transformed the holoblastic egg of the frog into a meroblastic one by condensing the yolk by means of a centrifugal machine. It was shown that salamander eggs reared in the dark became in certain particulars abnormal, and that electric rays accelerate the respiration of the eggs of the silkworm and hasten their hatching.

Teratogenesis. — Especially important is the experiment of Tornier, by which doubly and triply tailed lizards may be produced by making a triangular incision through the muscles and into the vertebræ. Also if a limb is transsected and a thread

be tied so as to divide the free surface of the stump, two appendages will arise. A lesion of the humerus may provoke the development of an extra limb.

Regeneration.—It was shown by Miss Peebles that in Hydra there are slight differences in the regenerative capacity of the different parts of the body, since the foot regenerates less well than the lateral parts of the trunk; also that $\frac{1}{200}$ of a Hydra will regenerate. Morgan enumerated certain laws of regeneration of the earthworm. The parallelism of regeneration and ontogeny was still debated. The truth that the essence of regeneration is not the restoration of some lost part, but the reassumption of the specific form, was illustrated by the regeneration of a jellyfish and a hydroid.

Grafting.—As the results of Born and Jøest marked respectively the years 1895 and 1896, so those of Crampton on the pupæ of Lepidoptera marked 1897. In Lepidoptera, as in tadpoles and earthworms, the grafted pieces, even if belonging to distinct species, exert no mutual effect. In plant grafting, however, Daniel got a reciprocal effect.

Sex.—No important advance in this subject was made in 1897. Nussbaum, working on rotifers, got in some cases, as Maupas did, a predominance of females. This was due, Nussbaum thinks, to an excess of food rather than a low temperature, as Maupas concluded.

Polymorphism and Metamorphosis.—The most interesting result was the rearing of an Amblystoma to the adult stages with retention of gills, by means of good food and a high temperature.

Correlation.—False correlation was studied and measured by Pearson and discussed by Galton. Warren determined quantitatively the correlation between the various parts of the human skeleton.

General Morphology and Physiology.—Contributions were made opposing the old interpretation of the germ layers. The science of general physiology was becoming outlined with the aid of new text-books. The importance of ions in physiology received new and stronger confirmation; the correlation between the composition of milk and the rate of infantile develop-

ment of various species was demonstrated. The important rôle of water in growth was pointed out. Nencki (following Tschirsch, '96) showed that the close relation between chlorophyl and hæmoglobin indicated their phylogenetic development out of one fundamental substance before animals and plants diverged. The organic food taken up by plants through their roots was further studied, and the old theory that plants feed exclusively on inorganic compounds received many hard blows. These discoveries, taken with the facts of the fundamental rôle of inorganic salts for animal nutrition, are breaking down the old distinctions drawn between animal and plant nutrition. Further valuable studies were made on the formation of albumen in plants. Muscle contraction, the electric organs, inflammation of wounded plants were newly studied. Dubois afforded much new data on hibernation. The literature on ferments grew rapidly, but not faster than the importance of the subject warrants. The reactions of organisms to light, heat, gravity, and electricity were further studied (Jennings, Loeb, and others). Czapek gives an account of the chemical differences between stimulated and unstimulated plant protoplasm.

Heredity. — Little was done on the important question of inheritance of the acquired. Whitman showed that in hybrid pigeons the period of incubation was the same as in the normally fertilized egg of the female species, and was uninfluenced by the fact that the species of the male was shorter brooded. Early developmental processes, then, are determined by the cytoplasmic peculiarities of the egg. Other experiments in hybridization were made.

Variation. — Applications of the quantitative methods of studying variation to particular problems began to appear. Brewster showed that those characters which are most variable in the individuals of a species are especially those in which the species of a genus differ. Bumpus found the house-sparrow, introduced into America, more variable than in Europe and concludes that its greater variability is the result of the partial withdrawal of natural selection.

Origin of Species. — Noteworthy are the book of Romanes on Darwinism, and C. L. Morgan and H. F. Osborn's theory of

evolution. Many workers pleaded for an explanation of adaptation on the basis of self-adjustment. No real progress was being made in this field, because the method was bad.

Geographic Distribution. — There was especial activity in the study of marine and fresh-water plankton and the theory of bipolarity in the distribution of faunas. Of general works may be cited Lydekker on mammals in general and Sclater on marine mammals.

Mental Functions. — The review of the literature in this department occupies one-fifth of the book. The work is too voluminous and technical to be summarized here.

General Theories. — Very little. A duel between Hertwig and Roux over the word "Entwickelungsmechanik." A suggestive work by Pearson on "The Chances of Death."

General biology has this year made its greatest advances in the study of variation, grafting, in general physiological problems, and in the chemistry of vital phenomena.